

(No Model.)

G. G. SHOEMAKER.

APPARATUS FOR THE MANUFACTURE OF CARBON BLACK.

No. 292,696.

Patented Jan. 29, 1884.

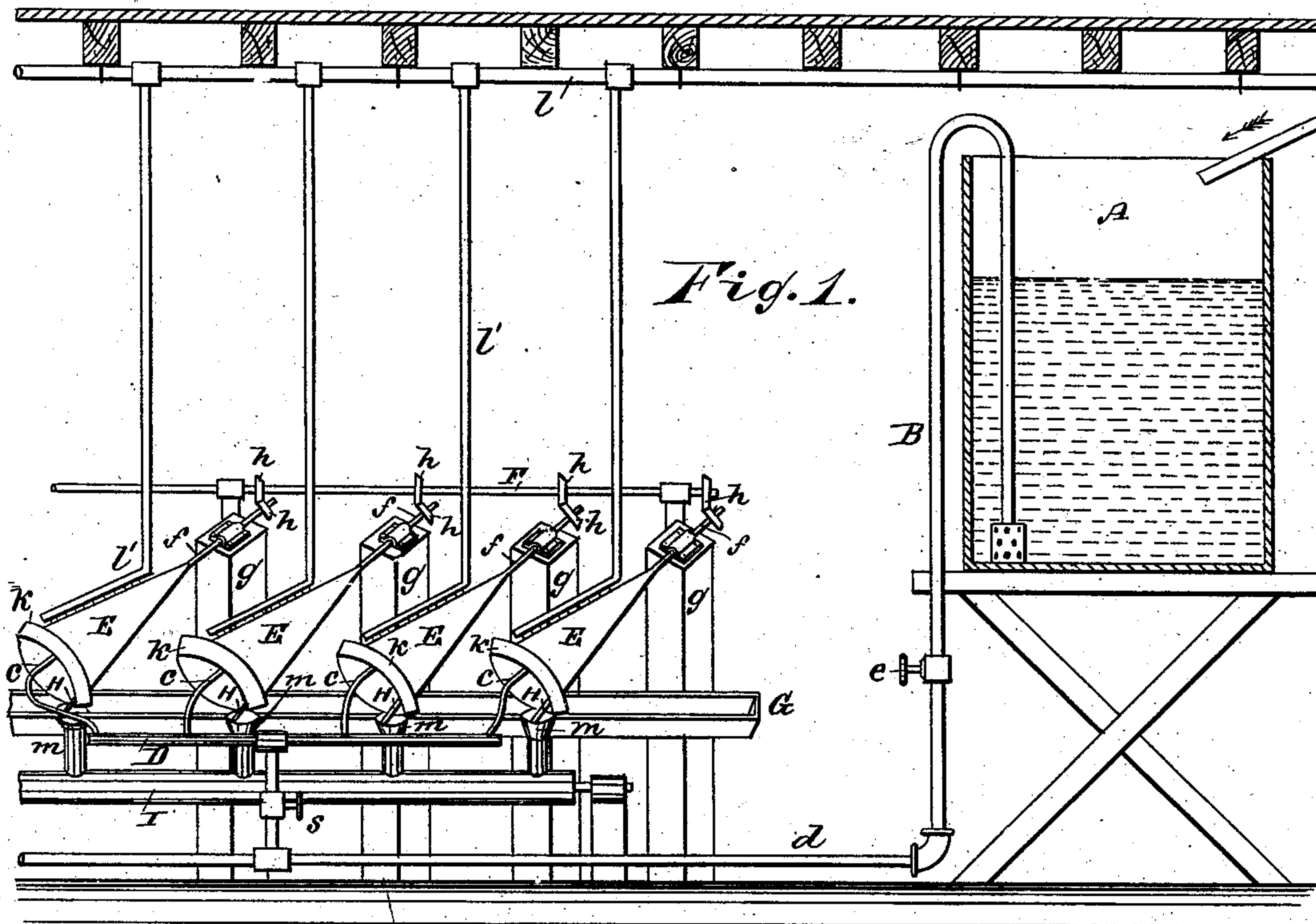


Fig. 2.

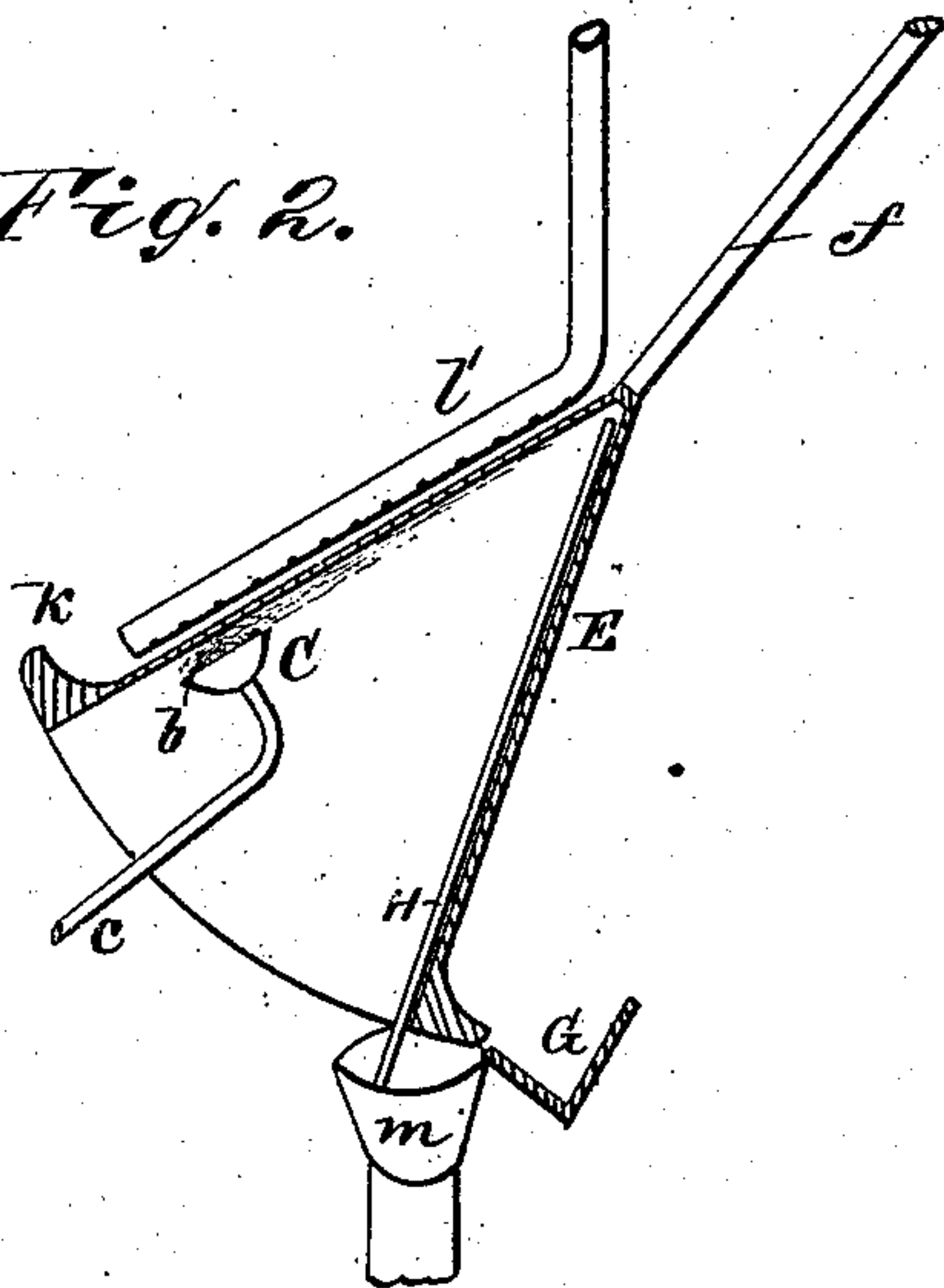
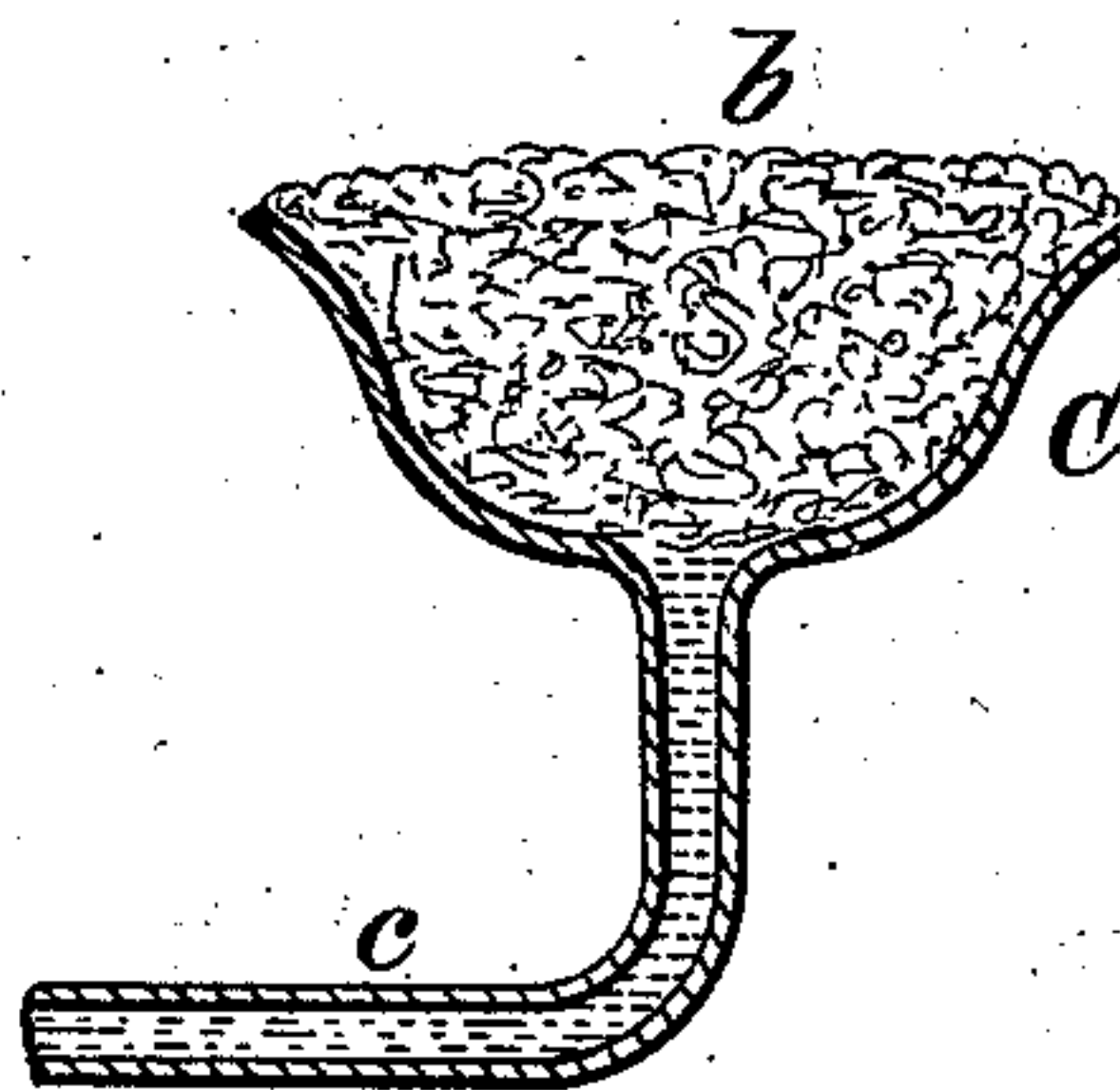


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR THE MANUFACTURE OF CARBON-BLACK.

SPECIFICATION forming part of Letters Patent No. 292,696, dated January 29, 1884.

Application filed November 6, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE G. SHOEMAKER, of Edenburg, in the county of Clarion and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for the Manufacture of Carbon-Black, of which the following is a full, clear, and exact description.

This invention has more particularly for its object the manufacture of lamp or carbon black from crude petroleum and thick oil or sediment commonly known as "black stuff," which is the refuse of petroleum-tanks, also from the acid waste of petroleum-refineries.

The invention consists in certain combinations of devices in an apparatus for making carbon-black from liquid fuel, as above described, and in which said fuel is supplied under pressure to burners charged with asbestos or other incombustible material, substantially as hereinafter described.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents a partly-sectional vertical view of an apparatus embodying my invention; and Figs. 2 and 3, partly-sectional views, upon a larger scale, of certain details.

A indicates an elevated tank containing the oil or fluid substance to be burned, and which may consist of a given amount of "black stuff" or acid petroleum waste, with a sufficient amount of benzine added to make the whole of the requisite fluid consistency. The liquid fuel is drawn from said tank by means of a siphon, B, for delivery under pressure to the burners, that, by reason of their construction, require a certain pressure to supply them. Said burners consist each of a cup, C, filled with loose asbestos or mineral wool, *b*. Any number of these burners are mounted by small tubes *c* upon a horizontal pipe, D, which is supplied with liquid fuel from the tank A by the siphon B, and a connecting-pipe, *d*, subject to control by a regulating or shut-off cock, *e*.

E E are a series of sheet-iron or other thin cones of suitable dimensions to receive within them from beneath one or more of the burners C. These cones are arranged slightly inclining, apex upward, and so that their upper

surfaces are not greatly removed from a horizontal position, and their bases or open lower ends are at right angles, or thereabout, to the longitudinal axes of the cones. The apex of each cone is closed and secured to a rod or shaft, *f*. These shafts are journaled on posts *g*, and revolved by bevel or friction gearing *h* from a power or counter shaft, F. The rim of each cone E, at its base, is turned outward, or made to form a projecting deflector, flange, or curb, *k*, the purpose of which will be hereinafter described.

From a pipe, *l*, overhead, cold water is supplied by dip-pipes *l'* to the outer and upper surface of the cones, said dip-pipes being suitably bent and perforated at their lower parts, to lie parallel with and close to the upper inclined surfaces of the cones, and to distribute over the same the cold water which issues from said pipes. The tubes *c* are so bent or inclined as that the flames from the burners C will play directly upon the interior of the upper sides of the cones opposite the distributing bent lower portions of the pipes *l'*. In this way the flames strike the coldest portions of the cones, which causes the fumes to be condensed. The cold water, thus striking the cones immediately over the flames of the burners, naturally gravitates toward the base ends of the cones, and, coming in contact with the flanges or curbs *k* of the cones, is deflected into a trough, G, running along under the cones, and thence carried away.

Directly under the cones, in front of the water-trough, are funnels *m*, to receive the carbon produced by condensation of the fumes as it is removed from the interior of the cones. These funnels *m* have attached to them steel scrapers H, which extend up within the cones on the sides thereof opposite to the sides on which the flames of the burners play.

The operation is as follows: As the cones E are rotated, the carbon-black formed upon their inner surfaces is detached by the scrapers H, and by the directions assumed by the base ends of the cones readily falls into the funnels *m* and passes into a trough or tube, I, from which it may be removed by an elevator or any other suitable means.

In an apparatus of this description the greatest facility is afforded for increasing or decreasing its working capacity to suit a variable



demand or different requirements. Thus in an apparatus made up of a large number of rotating cones and burners the same may be worked in independent sets of, say, three or four in each set—that is, the burners of each three or four of the cones may be supplied with the liquid fuel by a separate branch from the main supply-pipe and be controlled by a separate cock, *s*. This provides for the supply being cut off from certain of the burners without shutting it off from the others. The gearing also by which the cones are rotated can be so arranged that any single cone or series of cones can be disconnected without affecting the others. The oil or liquid fuel, being under hydrostatic pressure, is suitably supplied to the burners and caused to saturate the asbestos with which the cups of the burners are filled, and which forms the burner-surface. The asbestos, being incombustible, can readily be recleaned, when clogged with oil or soot, by exposing it to the action of fire. Furthermore, the cold-water perforated distributing-pipes, arranged in relation with the cones and their burners as described, effect a perfect and rapid condensation of the carbon within the cones, and as the cones are rotated the flame and heat of the burners are constantly presented to a bright or clean cone-surface by reason of the action of the scrapers on the rotating cones, and whereby the carbon deposited on the interior of the cones is prevented from being consumed or injured by the flame and heat of the burners.

The invention is not necessarily restricted, so far as the process in connection with the cones and other apparatus are concerned, to the use of petroleum as a fuel in a strictly liquid condition, inasmuch as the natural vapor of petroleum, or “natural gas,” as it is termed, might be used.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In apparatus for the manufacture of lamp or carbon black, the combination, with one or more rotating devices for the collection of the black upon the surface or surfaces thereof, of one or more cup-shaped burners packed with asbestos, mineral wool, or other like incombustible material, and devices for supplying the fuel under pressure to the burner or burners, substantially as specified.

2. In an apparatus for manufacturing carbon-black, the combination of the rotating hollow cones *E*, made open at their bases, and arranged for operation as described, and of burners within said cones, arranged to project their flames against the upper sides of the cones, with ducts or pipes arranged to distribute cold or cooling water over the upper sides of the cones, on the exterior thereof, and in relation with the burners, essentially as and for the purposes herein set forth.

3. In an apparatus for manufacturing carbon-black, the combination of the rotating hollow cones *E*, arranged for operation as described, and having deflecting flanges or curbs *k* around their open bases, the perforated cold-water-distributing pipes *l'*, and the burners *C*, substantially as shown and described.

4. In an apparatus for manufacturing carbon-black, the combination of the stationary scrapers *H* with the rotating hollow cones *E* and the burners *C*, arranged for operation in relation with each other essentially as and for the purposes specified.

5. In an apparatus for manufacturing carbon-black, the combination of the elevated tank *A*, the siphon *B*, the pipes *d* *D*, the burners *C*, and the rotating hollow cones *E*, substantially as described.

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Witnesses:

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